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CUTWORM STUDIES IN THE HAT CREEK AREA DURING THE SEASON OF 1939

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by
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Berkeley, California
March 11, 1940

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SUBJECT—

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Forest Insect Laboratory
Berkeley, California
March 11, 1940

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APPROVED BY:

J. M. MILLER
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SUBMITTED BY:

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CUTWORM STUDIES IN THE HAT CREEK AREA DURING THE SEASON OF 1939

Recent studies have shown that cutworms, long known to be economically important in the propagation of agricultural crops, are also injurious to newly formed tree seedlings. These insects have proven to be a serious obstacle to the successful establishment of seedlings in experimental investigations on direct seeding in California. It is quite probable that they are an important factor in preventing the successful establishment of seedlings under natural conditions.

Investigations of the California Forest and Range Experiment Station on seedspots established in connection with site factor studies on the Stanislaus National Forest, have shown that young succulent seedlings of ponderosa, Jeffrey, and sugar pines, as well as incense cedar, are readily killed by cutworm attacks. The species responsible for the damage in the Stanislaus area is thought to be Euxoa excellens infelix (Sm.), although the determination is based on only one specimen. Damage has occurred in similar studies in the Big Springs and Burney Springs Brushfields on the Lassen National Forest, but prior to 1939 little study had been devoted to the insect involved. One adult, having the characteristics of the genus Euxoa, was secured in 1938 from the Burney Springs area, but no specific determination has yet been made on this individual.

In 1939 the Bureau of Entomology and Plant Quarantine initiated preliminary studies on cutworms in the Big Springs and Burney Springs Brushfields. The objectives of this work were: (1) to collect larvae for rearing purposes; (2) to obtain adults for taxonomic study; (3) to secure data on the amount and time of cutworm injury to pine seedlings.

Since no program of planting, involving the direct seeding method, was in progress on either of these two areas in 1939, and because of the difficulty of finding natural stands of germinating seedlings, it was necessary to establish seedspots from which periodic collections of cutworms could be made. Accordingly, 50 seedspots each of ponderosa and Jeffrey pine were planted on the two areas early in April. The spots were screened with cones of ¼-inch mesh hardware cloth (Figure 1) to prevent rodents from digging up the seed. It should be noted that this size mesh does not prevent cutworms from migrating into the planted area. Weekly examinations of each seedspot were made as soon as germination began during the latter part of May.

It should be mentioned in passing that cutworms are generally nocturnal in habit. They feed and move about at night, and hide under litter or a short distance below the surface of the soil during the daytime.

The species attacking pine seem to prefer young, developing seedlings in the tender, succulent state, and do not attack older individuals in which woody tissue has begun to form. The most common type of injury is the severance of the stem of the developing seedling just above the ground level. The larva may devour the basal portion of the stem, but usually leaves the upper portion bearing the cotyledons. In some cases the cutworms fail to chew entirely through the stem, but weaken it to the extent that it falls over of its own weight. Occasional plants may be slightly injured near the ground level, in which case a callous will form over the point of attack if no further feeding takes place.

It is worthy of note that seedspots planted in the manner described above serve as centers of attraction for cutworms that prefer to feed on the type of seedling being grown. Thus while some damage may be caused by larvae which are present in the soil in the particular spot where the seeds are planted, it is probable that most of the damage is caused by cutworms that migrate in from adjacent areas.

The work of the 1939 season was unsuccessful from the standpoint of providing cutworms in any great quantities for rearing studies, and because of improper technique and poor facilities, attempts made to obtain adults for taxonomic study met with failure. However, a limited amount of information was obtained on the extent of damage caused by cutworms in the Big Springs and the Burney Springs areas, and some data was secured on the destructiveness of individual larvae. The amount of injury sustained by all seedspots throughout the season is summarized by area and species in Table 1. These data show that approximately 11 percent of the seedlings were killed by cutworms, but the amount of damage for both species of pine was not consistent in the two areas.

Table 1

SUMMARY OF CUTWORM DAMAGE TO GERMINATING PINE SEEDLINGS

		Big Springs		Burney Springs	
		Ponderosa Pine	Jeffrey Pine	Ponderosa Pine	Jeffrey Pine
Number of Seedspots Planted		50	50	52	51
Seedspots with one or more seeds germinated	Number	40	38	39	33
	Percent	80.0	76.0	75.0	64.7
Total Number Seeds Germinated		78*	153	166	78
Seedlings Cut	Number	12	12	14	10
	Percent	15.4	7.8	8.4	12.8

*Based on 33 seedspots. Remaining 17 were utilized for rearing purposes prior to complete germination.

of the seedlings were killed by cutworms, but the amount of damage for both species of pine was not consistent in the two areas.

Periodic counts of the number of dead seedlings caused by feeding of 12 half to full grown cutworms, caged in individual cages, showed that a single larva was able to cut off an average of 4 to 5 seedlings during a period of 6 weeks. The maximum number cut by any one larva during this period was 9 and the minimum 1. The heaviest damage occurred during June when the larvae are most active, and the seedlings were still developing. Injury practically ceased by the second week in July. These data cannot be considered conclusive, due to the small number of observations made, but they are considered indicative of the destructive ability of an individual cutworm.

Further attempts will be made during 1940 to collect and rear these insects at Hat Creek.

Berkeley, California
March 6, 1940

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Junior Entomologist

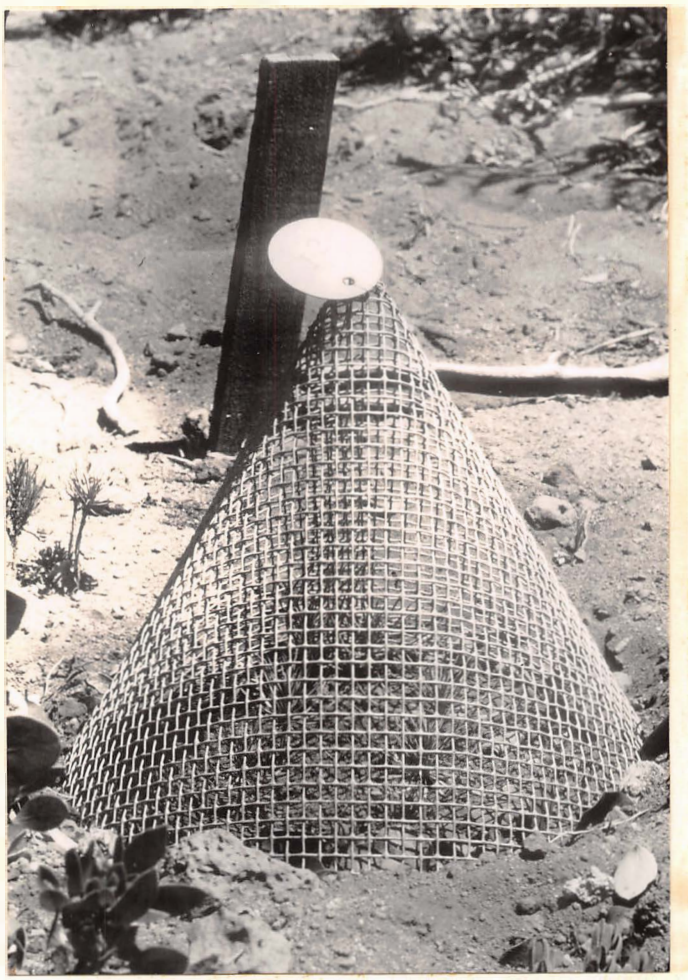

Figure 1 Seedspots are protected from rodents by the use of cages similar to this, made from ¼-inch mesh hardware cloth; but cutworms readily migrate into the seedspot to feed on the developing seedlings. (11241)